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# The Republic of The Philippines: Epidemiology and Epigenetics

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## ABSTRACT

A brief, yet concise investigation was conducted on the Republic of the Philippines, with a keen interest in the epidemiology of the current urban areas of the nation (+150,000 inhabitants), as well as possible epigenetic change that may be induced from disease or environmental stressors upon these same groups of people. G6PD deficiency, a common disorder among persons in urban dwellings within the Republic of the Philippines (Hsia 1993) was found to have a strong correlation of incidence with members of other nations in localized proximity to the equator. Additionally, low birth weight in infants has been identified as a potential epigenetic cue in those of the emerging, current population (Kuzawa 2012).

## BACKGROUND

- **Political Origins:** Territory colonized by the Spanish in the 16<sup>th</sup> Century. As the effects of colonial control began to wear off over the centuries.
- Self-governing commonwealth in 1935, but the decades following World War II brought inevitable political turmoil with several military and political coups (cia.gov).
- **Topographical and Climactic Overview:** 300,000 sq. km. of islands, with vast mountains and narrow to extensive costal lowlands. Despite this varied topographical setup, only 17.33% of this land is used for crop intensive activity, with a current ecological threat of uncontrolled deforestation and soil erosion, due to extensive population growth and poor irrigation management (cia.gov).
- **A model for study:** This country is an island, which to an extent provides pathogenic isolation. Less than 5% of the population is vaccinated against common diseases such as the flu, etc., so this provided a simplistic medium to study disease pathogenesis and transmission without many conflicting and lurking variables.
- Immigration and emigration is much lower, creating an environment for genetic drift in populations with fewer outside genetic influences

## OBJECTIVES

- Epidemiological Overview
- Epigenetic Change in Urban Populations
- Current Healthcare Crisis
- Societal and Governmental Response

## An Epidemiological Overview

- A growing and resilient economy with political stability, but is still lethally affected by many “simple” diseases and disorders that are mutually observed in third world countries such as diarrhea, bacterial infection, etc.
- The healthcare system is still in the process of making that forward jump to a 1<sup>st</sup> world country status, and it certainly does not have the economic investment of the government (Table 1).
- Vaccination against pathogenesis is infrequent among the majority of the population(5%), ensuring a higher infection potential among those in urban areas.



The Rundown: A Filipino Perspective

|  |                       |                           |                   |   |                        |   |   |
|--|-----------------------|---------------------------|-------------------|---|------------------------|---|---|
| <b>Socioeconomic Inequality (Gini Index)</b> | 44.8 of 100           | 42 <sup>nd</sup> in World | -                 | <b>Population in Urban Environment (125,000+ occupants)</b> | 48.8%                  | - | - |
| <b>Birth-Mortality Ratio</b>                 | 24.62:4.95 (per 1000) | -                         | -                 | <b>Average Education Length</b>                             | 11 <sup>th</sup> Grade | - | - |
| <b>Below Poverty Line</b>                    | 26.5%                 | -                         | -                 | <b>BMI Index</b>  | 20.2% underweight      | - | - |
| <b>GDP</b>                                   | 57.2% (Business)      | 31.6% (Industry)          | 4.1% (Healthcare) | <b>Mean Age of Parents</b>                                  | 23                     | - | - |
| <b>Annual Family Income</b>                  | \$120 USD             | -                         | -                 | <b>Population over age 55</b>                               | 5.7%                   | - | - |
| <b>Physician/Clinician Concentration</b>     | 1:1000 persons        | -                         | -                 | <b>Vaccination Rate</b>                                     | 5%                     | - | - |

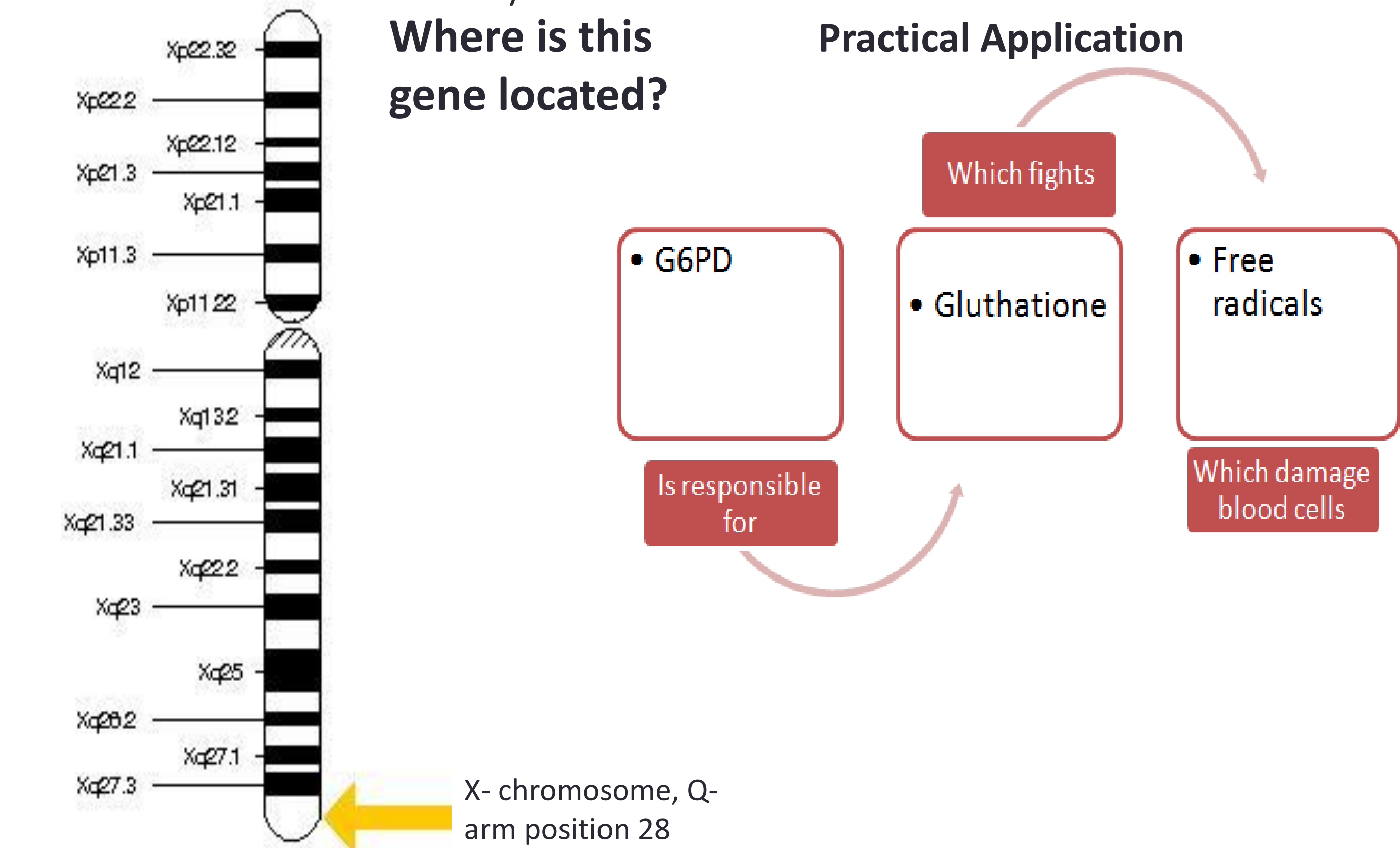
Table 1. Displayed is a chart that provides fundamental socioeconomic and healthcare statistics

## The Healthcare Crisis

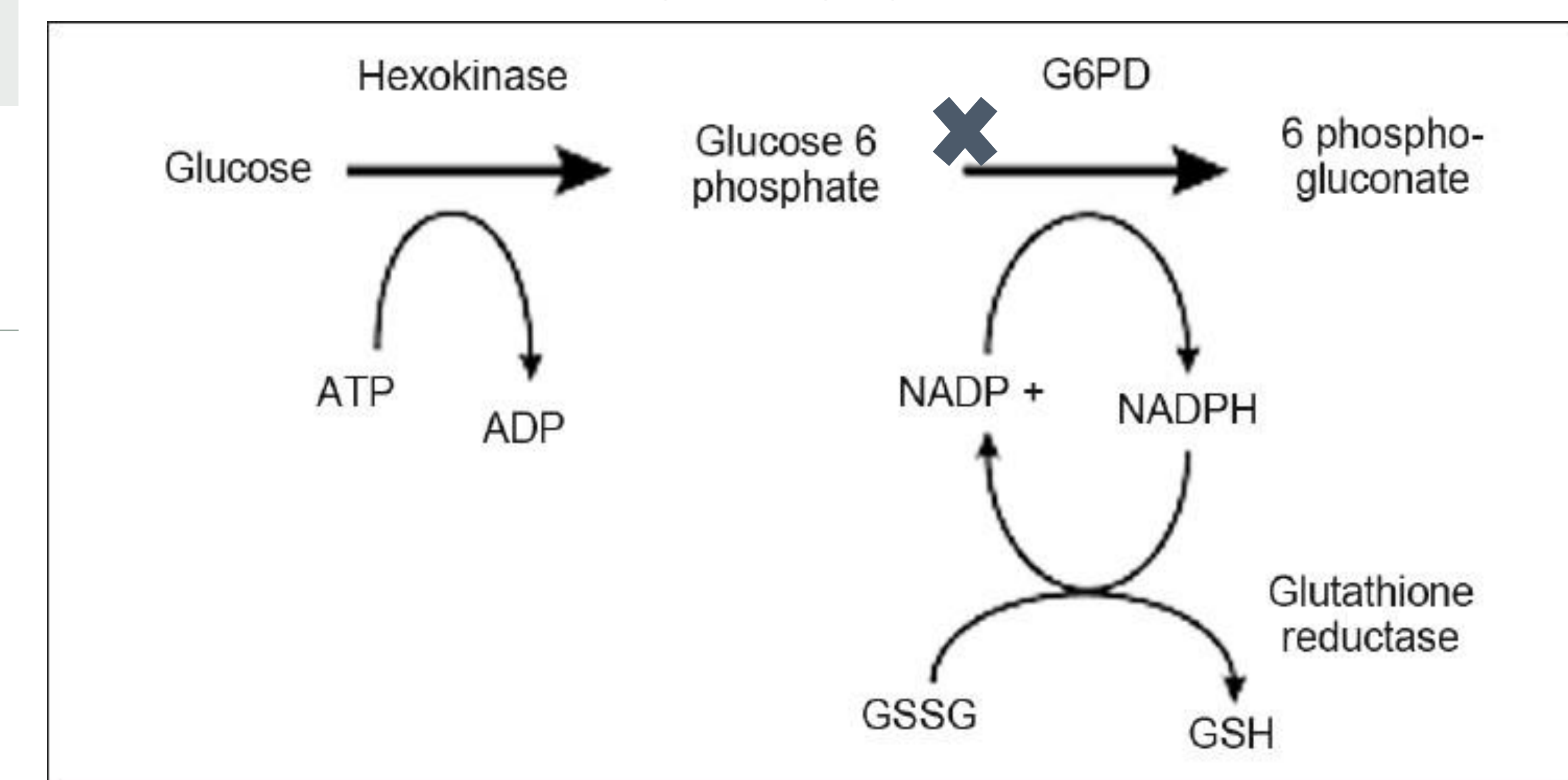
- When a family survives off of \$120 USD, healthcare for disease and injury is a theory, not a reality.
- This creates economic stagnation in the healthcare market, resulting in a lack of funding for physicians.
- A lack of stimulus results in education deficiencies on disease prevention and response. As a result there is an observed birth-mortality ratio of 24.62:4.95, and a population where 5.7% of the population is over the age of 55.
- A lack of voluntary societal response to pathogenesis and aseptic technique has invoked an involuntary epigenetic response via natural selection, as seen in G6PD disorders.

## G6PD Disorder

- **Background:** Evolutionary adaptation to malaria. Individuals with the disorder are often anemic (variable levels) and depending in the severity, require transfusions in order to maintain a stable systemic erythrocyte count.
- **Reasoning:** Low erythrocyte count provides a natural defense against *P. falciparum*, makes infection more difficult for the protozoan species. Those that are infected often cope better with malaria.
- Possible transmission from Spanish in 16<sup>th</sup> Century upon colonization
- X-linked recessive disorder
- World's most common enzymatic disorder



### How it works



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